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THE AMERICAN

GAS LIGHT JOURNAL

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[OFFICIAL NOTICE.]

New England Association of Gas Engineers.

BIRMINGHAM, CONN., January 31, 1889.

The annual meeting of the New England Association of Gas Engineers will be held at Youngs' Hotel, Boston, on Wednesday and Thursday, February 20 and 21, 1889. The meeting will be called to order on Wednesday, at 10 o'clock A.M., by the President, Hon. A. M. Norton.

At one of the meetings a lecture will be delivered on the "Composition of Boston Gas," by Dr. Lewis M. Norton, of the Massachusetts Institute of Technology. From Dr. Norton's known position as a scientist, and his ability as a speaker, it can be assumed without question that the Association will listen to an interesting lecture.

The following papers have been promised:

"The Springer Process," by H. S. Chase.

"Incidents in the Life of a Superintendent of a Small Gas Works," by A. F. Cooper.

"Use of Lima Oil for Enriching Gas," by J. L. Hallett.

"Elements of Gas Analysis," by E. C. Jones.

"Artistic Articles Used in Connection with Artificial Lighting," by R. J. Monks.

"Photometric Standards" (Report of Committee), by C. F. Prichard.

"Gas and Electricity," by S. G. Stiness.

I think that the members will agree with me that the lecture and the papers named above will make the literary part of our meeting a great success. No member of the Association and no man actively connected with the gas business in New England can afford to be absent, if it is possible for him to be present.

Persons eligible for membership, either as active or associate members, and wishing to join the Association, will please send their names to the Secretary at once, who will immediately forward them blank forms of application.

Any member of the Association wishing to have any particular subject discussed will please notify the Secretary, who will in turn notify the members of the Association of the same, so as to enable all to come prepared to discuss the subjects more intelligently than otherwise would be possible.

Members wishing friends invited to the meetings will please notify the Secretary. CHARLES H. NETTLETON, Secy.

BRIEFLY TOLD.

THE FEAST PREPARED FOR THE WISE MEN OF THE EAST.—Secretary Nettleton's current notice should be most satisfying to all concerned—which virtually means every gas manager in the States, and to not a few outside of these as well—for the welfare of the New England Association. His nice attention to detail, so balanced, however, by no scantiness of measure in respect to the working up of a grand plan, could not very well result in else than success; still we venture to say that none other has better cause for gratified surprise than himself at the royal looking outcome of his labors. It is seldom that one scans an agenda list that gives greater promise of value than that prepared for the forthcoming reunion of the Parent Association at Boston, for it is at once

technical (and pleasantly so), practical and otherwise diversified in feature. And yet another encouraging circumstance is the presence of a goodly quota of the new contingent (as far as the presentation of papers is concerned) standing shoulder to shoulder with the yeomen of the old guard. All this matter for congratulation leads us back to one primal point in the details of organization of the Association, which has stood in good force for the Society's benefit, and which is likely to so stand it for many a year to come. Its members manage their affairs in good old Yankee fashion, and thus do not find it necessary to model their action on the simple request or continued persistence of those whose interest in the Association *per se* is of the mythical sort. Bluntly said, fair service is fairly requited. And had that practice been the guide in the affairs of the British Gas Institute, the gas world now would not be mortified over the knowledge that that body has been all but dismembered, to the end that one of its list—rather aptly denominated, though, as being cloaked by the skin of a "trader"—might gratify his spleen on, or show his revenge simply because another "trader" in the long ago carried off a meal that both had competed for.

Turning back to the object proper of these comments, we must say that it is with pleasure we note the name of the distinguished scientist, Dr. Lewis M. Norton, of the Institute of Technology, who is to lecture before the Association, and all may not only give cordial and unqualified assent to Secretary Nettleton's assumption "that the Association will listen to an interesting lecture," but go a step further and say that it will be instructive besides. The members are certain to look forward with eagerness to what the Committee on "Photometric Standards" shall report. Chairman Prichard, being a scholarly man, of the thoroughly calm style besides, is sure to have given to this much-vexed question many hours of thought in the twelvemonth, hence we think our opinion that his verdict (which we presume will be concurred in by his fellow Committeeman, Mr. Taber) will be well worth listening to shall have been sustained by the evidence to be submitted. It would scarcely seem appropriate not to mention the reappearance of Mr. Stiness in the arena, and we may take it for granted that his opinions—as they indeed always are—will be put forward in no uncertain way. His choice of subject recalls to mind the hope not long since expressed in our "Item" columns, by "Haddam," that Dr. Amory might consent to a ventilation at the meeting of the Brookline Company's electric experiences in a practical way; but if Amory won't and Stiness will, why the difference is simply that betwixt Brookline, Mass., and Pawtucket, R. I.

When one looks over the field even cursorily it cannot be gainsaid that the Boston convention must result in a great harvest.

In our last we mentioned the voluntary retirement from active service of Mr. John M. Hill, who for one-third of a century had been connected with the Concord (N. H.) Gas Light Company, as its Agent and Treasurer. Years of arduous and faithful service these were, too, crowned with the meed of rectitude. Of course, we are sorry to lose him from the ranks; but one's days of strength—more's the pity, shall we say?—are not quite so tenacious as those of the brook that England's bard has celebrated in immortal verse. Still, it is some recompense to be able to say about the one who turns aside from the struggle that honor having ever accompanied him in the hurly burly, quits him not now in his hours of well-earned rest. These things being incontrovertible, it was only natural to suppose that those whom he served would not care to part with him officially without having signified their appreciation of that service. Hence it came about that on the evening of the 2d inst. a special meeting of the Board of Directors of the Concord Gas Light Company was called, at which gathering the guest of honor was the retiring Treasurer, who was speedily confronted by the Hon. E. H. Woodman. The latter gentleman having spoken most felicitously of the services rendered the Company by Mr. Hill, and having testified in glowing words to the strength of the regard in which his fellow Directors held him, the spokesman, on behalf of the Company, presented Mr. Hill with a large inkstand of solid silver, mounted on a polished ebony base. The vessel is a fac-simile of the new gasholder completed for the Company last fall under Agent Hill's supervision. But as the thing itself will rest on Secretary Nettleton's desk at the forthcoming meeting of the New England Association, we need only further remark about it that it bears the following inscription:

1855. Presented to 1888.
JOHN M. HILL,
By the Concord Gas Light Company,
Jan. 1, 1889.

in token of recognition of 33 years' faithful service in the management of the affairs of the corporation.

The *savoir faire* which ever belonged to the New Hampshire family of Hill—prominent as they were in the literary, social, political and commercial history of the Granite State—enabled the recipient to accept the gift with grace and fluency. The concluding chapter to this pleasing proceeding was the adoption by the Board of the following:

Whereas, Mr. Jno. M. Hill has expressed his wish to retire from the position as Treasurer and Agent of the Concord Gas Light Company, which he held for the past 33 years,

Resolved, That the Directors of this corporation desire to inscribe upon their records a statement of their sense of appreciation of the faithful service which has been exercised in behalf of the Company for a third of a century; that they wish to testify to his uniform courtesy as an officer of the Company; to the general satisfaction which has attended his dealings with the public, and to the success which has followed his management of the affairs of the Company. While they cannot properly refuse the request for the relief from active duties which has been so well earned by faithful service, it is a matter of regret that the corporation is to be deprived of a valued officer, its employes of a kind, and sympathetic friend, and this Board of a genial companion and helpful counselor; and we most heartily join in the wish that his declining years may be filled with that comfort, rest and peace which he so justly deserves.

As is quite natural to suppose, Prof. Stoddard's report on the candle power of the arc lights supplied to the city of Springfield, Mass., under a contract calling for a lighting value of 2,000-candles each, but which were shown to be something like 60 per cent. below the stipulation, has nettled to a high pitch the controllers of the Springfield-Thomson-Houston Company. Their indignation, however, takes on a most sickly hue, and their efforts at justification—for no attempt is made by them at refutation—are paler still. They coolly say that they are furnishing as good an arc light as is obtained anywhere—and we do not doubt this—else for the money; and that is about all that there is of value in their reply to the Springfield authorities' reproach to them. One result of Prof. Stoddard's figures was to cause the Council to inquire, from various points where the Thomson-Houston system was in use, as to the nature and value of the service rendered at such points. All of the replies are interesting, many of them are rich to the Dotheboys' Hall point, and a few are charming in their innocence. For instance, Hartford replies that some 2,000-candle power arcs are on the streets, but that the only tests ever made there as to the real value were conducted by the lighting purveyors. Salem, Mass., thinks that the lights have a value of about 2,000-candle power, but the lighting superintendent admits he "did not know much about it, except by hearsay." And so it is all through. To cap the whole thing, one city (which shall be nameless here) admits that its contract calls for 2,000-candle power arcs, but it "was well understood by the committee in charge of the contract that the lights would not exceed a value of 1,100 candles. The higher figure was merely a term that had nothing else than a trade significance." The entire matter resolves itself into a case of skim-milk passing itself off for cream; with the dear public fully convinced that its palate is being tickled by contact with the richer fluid.

THE following, from Mr. F. Egner, under date of Jan. 24th and Feb. 2d, in connection with his series of articles (closed with this issue), explain themselves—the second "note" will make interesting reading in connection with Mr. Rew's injudicious correspondence published on page 180, this issue. The "note" was received too late for printing in our number for last week:

"In the mention of 'Boardman's Hydraulic Main,' that type was employed for comparative purpose only; presuming it to be new, because of comparatively recent illustrations and advertisements of it. I have been informed on good authority that that particular style of main was invented by that veteran builder of gas apparatus, Jas. R. Floyd, and patented by him April, 1868. The patent number is 904. The Floyd main is said to have been in use at the Northern Liberties Works (Phila., Pa.) for 20 years.

"The published illustration (see JOURNAL, Jan. 21, p. 107) is from the first of a series of patents granted to Mr. H. C. Rew, and as it does not and naturally cannot exhibit the whole of the completed apparatus, as shown in regular sequence in the series mentioned, we may, as previously stated, make these patents the subject of a separate article, at some future period, in order that the reader may obtain a full conception of the tenor and spirit of the same."

THE Lee (Mass.) Gas Works have passed presumably into the hands of the local electric company. At any rate, the transfer was effected by Mr W. L. Dresser.

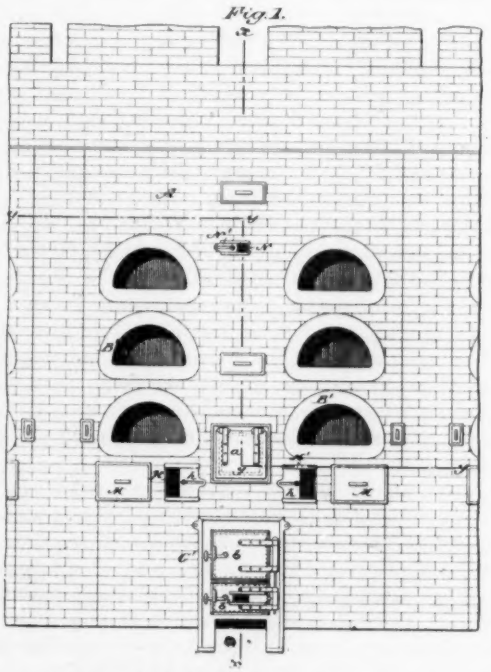
[Sixth and Concluding Article.]

A Review of Patents Invented and Inventions Patented in the Gas Interest the Past Year.

By Frederic Egner.

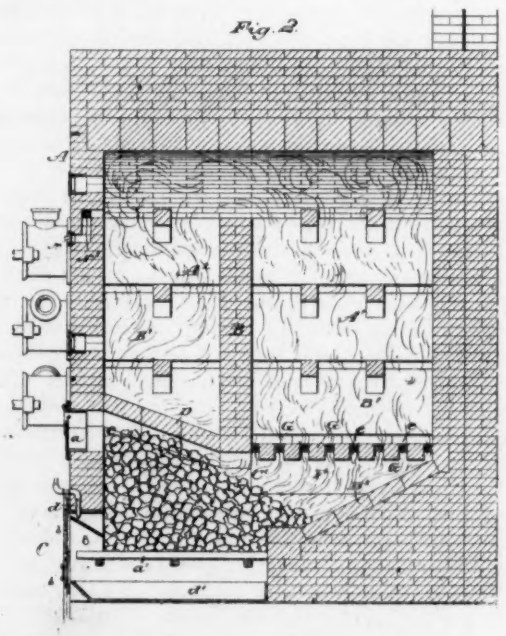
Mr. G. S. Dwight (deceased) invented a process, or rather an apparatus for making water gas, which possesses some excellent features Mr. Dwight seems to have been a careful student of the science of gas making. Portions of his specifications are instructive reading.

The following illustrations show the retort furnace patented by Mr.



The Flemming Furnace.—Fig. 1.

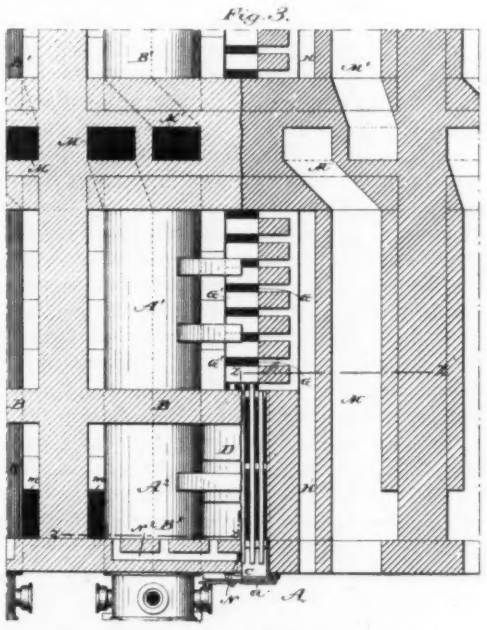
D. D. Flemming, of Jersey City, N. J. Fig. 1 portrays a front elevation of a bench of 6's; Fig. 2 is a section of side elevation, and Fig. 3 a plan view of same on line *y y y*, through Fig. 1. The drawings are so plain that a further explanation of them is deemed unnecessary. The inventor states the object of his invention to be, "By a simple and inexpensive alteration of furnaces now used for direct firing, to attain all



The Flemming Furnace.—Fig. 2.

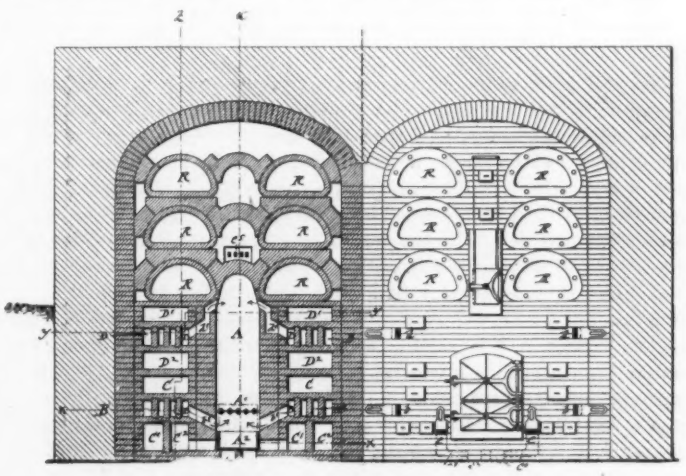
the advantages of the costly and elaborate regenerative furnaces." As Mr. Flemming is known to be a practical gas man, he may have put his ideas to a working test, and the results could not fail to interest all who are now using the old style of bench furnace.

The next two engravings present views of a half-depth regenerative furnace patented by Mr. O. B. Weber, son of the well-known architect and engineer, Mr. Adam Weber, of New York. Fig. 1 represents in part a front elevation and in part a transverse section of a bench with such a furnace; but Fig. 2 more clearly shows the nature of the im-



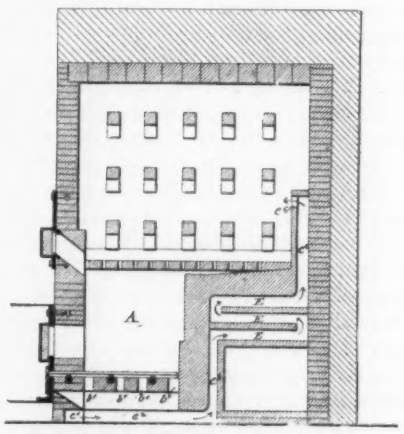
The Flemming Furnace.—Fig. 3.

provement in Mr. Weber's furnace—viz., the air channels shown by letters *E*, *e*, etc., and the arrows. It has been claimed that Mr. Adam



The Weber Furnaee.—Fig. 1.

Weber was the first to introduce fireclay retorts in this country. He has been in the business of building and improving gas works for many



The Weber Furnace.—Fig. 2.

years; and as the furnace shown very likely was constructed with his approval, it is likely to be a good one, and interesting to gas makers.

With this subject we close our "Review of the Patents Invented and

Inventions Patented for a Year in the Gas Interest." Since the first page of these articles was written quite a number of patents have been issued for carburetors, carbureting lamps, processes, and what not.

An alleged most wonderful process, which the promoters have called "The Toraya Improved Gas Process," was brought out at Philadelphia, Pa., on Jan. 1, this year. The circulars distributed to date state that an improved process for the generation of gas for illuminating and fuel purposes, under a number of letters patent to Jose F. Toraya *and others*, is the subject. Wood and oil are the materials used, and 8 to 10 cubic feet of gas is obtained to the pound of wood. How much oil gas goes to the 8 or 10 cubic feet is not stated. As the writer has not been able to find the patents issued to Toraya, these are presumably not yet published, if granted. The *others* are not mentioned, and would-be purchasers ought to carefully inquire into the matter before risking their money. As it is stated in the circular mentioned, among other things, that 1,000 cubic feet of gas, of 22 to 24-candle power, is to cost only 15 cents—just that, and nothing more—we may be excused if we deem further comments on the subject unnecessary. The readers of this JOURNAL may rest assured that if any real improvement or advance in our line is made they will be promptly informed of the nature of the same.

At some future time we may take up, illustrate, and explain the water gas apparatus in more general use, for the benefit of those who have not had the opportunity to study the same. The earlier forms of Hanlon, Leadley, Springer, Lowe, Granger, and other apparatus compared with the present more nearly perfected works of these inventors and engineers, are interesting and instructive, and sometimes not a little amusing to look at.

Hoping the present review has not been without interest to the readers of the AMERICAN GAS LIGHT JOURNAL, we will now close the patent volume of 1888.

The Petroleum Market for 1888.

Messrs. Watson & Gibson, in a specially prepared report to a contemporary on the petroleum market for 1888, say:

The year 1888, in the petroleum market, opened with a common expectation of higher prices. The shut-down movement inaugurated by the producers early in November, 1887, and which it was thought at first might not prove to be a successful compact, had demonstrated its integrity and value as a check upon the production by the opening of the new year. It had been argued by some that the necessity for the curtailment of production by the producers was a confession that production was likely to outrun consumption; but this did not appear to be the case. After the agreement had been in force for two months, it was then thought that it was an earnest movement on the part of the producers, acting in conjunction with the Standard Oil Company, to permanently increase the price and value of their commodity, and a great many prophecies were made in January, 1888, that the year would witness at least $1.50 per barrel for oil. Production each month was cut down by a stoppage of new development work and the failure to clean out or torpedo old wells, and a monthly reduction of between three-quarters of a million and a million barrels was in progress. Matters ran along until March, when dealings in petroleum certificates were inaugurated in the Stock Exchange, and as no adequate provision had been made by the authors of that experiment for certificates for delivery, which it was proposed by the Stock Exchange should be made daily, without the intervention of a clearing house, a corner developed, suddenly advancing the price of cash oil to above $1.40 per barrel in the Stock Exchange. The amount of oil changing hands at these figures, however, was very small, and about the only result of this squeeze was an advance in the Consolidated Exchange to $1 per barrel, regular way, for oil—that is, for delivery on the day following the transaction. This sharp advance, and the fact that certificates were scarce in the Stock Exchange, frightened the shorts into covering, and when this element was eliminated the market was left without either support or activity, and by June the price broke to the lowest figure of the year—71¾ cents. By July the constant reduction of stocks, and the improved feeling in railroad speculative circles, led to an advance to 85, and in August, under the same influence, to 92⅞. The highest price during the autumn was 96¼, and the lowest price since then was 82 cents in October. During the summer the cost of ocean transportation for petroleum, in common with other tonnage, increased rapidly, and practically doubled the cost of shipment as compared with the cost in the early spring. This tended to check export sales, and notwithstanding the large reduction in stocks which had taken place each month throughout the year, and the generally hopeful feeling which prevailed regarding the state of the crude petroleum market, the price of refined oil was lowered. Russian competition had something to do with it, perhaps, because of the greater facilities which had been created during the year for the transportation and sale in Europe of the Russian product. Of course, the cost of ocean transportation, in a great measure, affected the Russian product as it did the American, but the full effect of this was in a measure obviated by the building of several new tank steamers to ply between Batoum and Europe.

The Standard Oil Company of this country, in order to fully retain its commanding position in the European markets, during the summer established a branch company in London called the Anglo-American Oil Company, with a capital of £500,000, with the design of supplying the foreign market with American oil without the intervention of brokers and shipping agents, whose charges added to the cost of the oil laid down on the other side; and this matter of economy was regarded as sufficient to offset the increased strength of the Russian position. During the last three months of the year 1888 speculation in all departments of business was at a low ebb, and as the petroleum market in a general way must necessarily feel the indisposition of people to speculate, and as fresh affairs concerning the attitude of the producers, and the outlook for the Lima field, became factors in the situation, the price of petroleum failed to respond to a reduction of nearly 10,000,000 barrels in the visible supply for the year. On Nov. 1, 1888, the original contract between the Producers' Association and the Standard Trust expired, and the result of this was a slight increase in the development work undertaken in the oil country, and the cleaning out and torpedoing of some wells. Notwithstanding these efforts, however, there was no appreciable increase in production, and after the expiration of the shut-down agreement the ratio of the reduction of stocks monthly continued without material change.

The producers at the time of their contract received a call from the Standard Oil Company of 5,000,000 barrels of oil as a part of the understanding with the Standard, and 1,000,000 barrels were also set aside for the benefit of laborers in the oil country, who would be thrown out of employment by reason of the enforcement of this agreement. The price fixed on this oil, at which it might be called at any time within a year, was 62 cents, plus the storage charge on the oil from the date of the call to the taking-up time, when the oil would be taken up and paid for by the producers under the call. Some uncertainty surrounded this agreement, as the trade did not wish to take the oil off the hands of the producers; and the power which the producers thus held, at any time to throw any or all of this oil upon the market, acted adversely to the interest of the bulls, for small operators did not wish to buy oil in the open market when at any time thereafter a large portion of this 6,000,000 barrels might be thrown on the market. The call has been renewed in part, and it is understood that some portion of this oil has already been sold—probably 2,000,000 out of the 6,000,000 at least; but speculators, feeling that they are exposed to an avalanche of oil from this source, are disposed to hold aloof from the market. Then, again, there is some timidity on their part, owing to the situation in the Ohio oil field.

The total production in the vicinity of Lima, as reported to the Buckeye Pipe Line for the year 1888, was about 8,800,000, of which 1,300,000 were shipped away, leaving an accumulation there for the year of 7,500,000 barrels. If to this be added, we will say, at least 5,000,000 of barrels previously on hand, we see that by a fair estimate twelve millions and a half barrels of Ohio oil are now on top of the ground, and some uneasiness necessarily arises as to whether it may not finally be utilized for producing a high grade illuminating kerosene. The Standard Oil Company two years ago erected a refinery at Lima, but have ever since contended that they have been unable to discover any process by which it could be successfully converted into a refined article. The chemistry of the future, however, is likely to overcome the obstacle of sulphur contained in the Ohio crude, and a constant fear haunts the petroleum trade that a process may at any time be discovered to the detriment of the Pennsylvania product, which at present is the sole basis of our refined petroleum. The Standard completed during the time a pipe line from Lima to Chicago, about 200 miles in length, and this oil will go out to that Western city in increasing quantities as fuel, for it is cheaper and more cleanly than coal, and furnaces are easily converted into a proper form for the use of petroleum in lieu of coal.

The present stock of oil in Pennsylvania is about 18,000,000 barrels, and the present monthly consumption is about 750,000 barrels in excess of the production. So that, at the present rate of reduction, the stock of Pennsylvania oil, which is traded in on the exchange will soon be reduced to a very small quantity, and the natural effect of this should be an important advance in its price. If, however, by any chance Ohio oil should be considered as good as the old oil now in the tanks of Pennsylvania, and which, in the form of National Transit certificates, is now

traded in on the Petroleum Exchanges, the bullish complexion of these statistics would be materially modified, for Ohio oil is now selling for only 15 cents per barrel. The fresh oil which comes out of the ground in Pennsylvania from the white sand pools commands a premium of 25 cents per barrel, and refiners say that the new oil is worth that much more than certificate oil, as it is richer in those ingredients which make a high grade illuminating oil. Therefore the Standard Oil Company, which is interested in having the petroleum industry of Pennsylvania perpetuated, can through the increased price paid for fresh oil stimulate development work throughout Pennsylvania by means of this premium, without bidding up price of the whole mass of oil represented by certificates and traded in on the exchanges. The conditions of the petroleum market are likely to change at any time, and if any of those who read this review of the year are sufficiently interested in its varying phases, if they will write us at any time we will endeavor to supplement the information which we have given herein by adding to it any further information which may come into our possession as the months roll by. Either Pennsylvania petroleum is a very cheap or a very dear article. It is certainly very cheap, unless new territory can be found, of which there is no promise at present, or unless the Ohio product can be utilized soon as a basis for the production of high grade refined. If the latter can be done, then the Pennsylvania oil is very high, and it behooves all those who are interested in the subject to carefully watch the relative position of Ohio and Pennsylvania in this respect. During the latter part of the year 1888, as we have said, speculation was very light, and though transactions in petroleum took place daily in two exchanges in New York, one in Pittsburgh, one in Bradford, and one in Oil City, the amount of actual interest taken by the public recently has been equally as small as the volume of certificates divided between these exchanges. If any large speculators should come in the market they would have no difficulty in raising the price, because shorts would find it difficult to procure certificates for delivery in these five scattered exchanges, and the Standard Oil Company could hardly afford to part with the control of this product, which it is fair to suppose they now exercise.

Fluctuations in Prices per Barrel of Petroleum during 1888.

(Consolidated Stock and Petroleum Exchange.)

Months.	Opening.	Highest.	Lowest.	Closing.	Sales.
January	90⅛	97⅝	85¼	90¾	101,030,000
February	90⅝	94	86⅞	93⅛	39,612,000
March	94	100	83⅜	85	42,164,000
April	83½	89½	74½	86⅜	49,370,000
May	87	90½	82½	82⅝	13,256,000
June	82½	82½	71⅜	73	26,621,000
July	73⅛	85	72⅝	80⅞	22,444,000
August	81	92⅞	80⅜	92⅜	30,019,000
September	92⅞	96⅜	90	95⅜	24,679,000
October	95	96½	82	85½	39,939,000
November	84⅞	87⅜	82⅝	86⅞	21,961,000
December	86⅞	93½	84⅜	86½	30,145,000
Year	90⅛	100	71¼	86½	441,240,000

(New York Stock Exchange.)

Months.	Opening.	Highest.	Lowest.	Closing.	Sales.
January*	...	...	...	...	.....
February*	...	...	...	...	.....
March	93½	99	84	84	12,189,000
April	83½	87⅜	85¼	87	22,064,000
May	87¼	90½	82½	82⅝	7,595,000
June	82	82	72	73⅜	10,636,000
July	73	84⅞	72⅝	80⅞	11,925,000
August	81	92⅞	79½	92⅜	19,177,000
September	92¾	96⅜	90¾	95½	19,373,000
October	95⅜	95⅞	82½	85½	19,830,000
November	85	87⅜	82¾	86⅞	12,872,000
December	86½	93½	84¾	86⅜	18,178,000
Year	93½	99	72	86⅜	153,839,000

*Dealings in pipe line certificates on the New York Stock Exchange were inaugurated March 1st.

THE proprietors of the New Haven (Conn.) Gas Company are *not* considering the advisability of engaging in the electric lighting business, despite the seeming willingness of certain dealers in electric systems to create an impression to the contrary. The New Haven gas men are going along quite smoothly just now—in fact, their path never was a very rugged one—and are quite content to eat their present cake, content with its richness and sustaining qualities.

Notes and Comments.

By OBSERVER.

And why should we try to control the sale of coal oil when brought into competition with us? While I know of no valid reason why we should, I do know of good reasons why we should not; and the same reasons apply, in a greater or less degree, to the electric light. I think we all acknowledge that, taking it all in all, competition is a blessing. In my limited experience I have found that the average man likes to be free—free to buy where he pleases. It is repugnant to a free-born citizen to be *compelled* to anything. He rebels at dictation; although he can be led to where he cannot be driven. Hence the old outcry against monopolies. Personally, I believe a monopoly of the gas business when regulated and controlled by equitable laws is the best thing in and for our business; but the public, who we serve, may not, and I believe do not, think so. The public prefer to be able to purchase their supplies at more places than one. They will consume more, pay more, and pay more freely for this privilege. I verily believe this may be applied to the lighting interests. Unite them and the public (whose special privilege when speaking of a gas company seems to be to criticise) will exclaim, "monopoly, run to seed."

Another disadvantage that I seem to see in a non-union of the "twin interests" is that the incentive to push the sales of gas is destroyed. The word now is, "We furnish both gas and electric light; take which you please," or what is worse, "both"—which means the supplying of and caring for of two lighting agents to perform the work of one.

But, after all, the great question is, "Will it prove remunerative?" There is much to be said under this head—more than space will permit, and I ask my progressive reader to be patient with me.

In view of past experiences, present conditions and future prospects of the electric lighting interests, I have much sympathy with the man who—having these experiences, conditions and prospects staring him in the face—moves slowly in the path to electric lighting. This writer will not term that student a moss back. In common with others, I feel a trifle wearied on being reminded so often that the world moves. It smacks somewhat of the article that Dr. Johnson advised his friend, Boswell, to clear his mind of, viz., "Cant." Of course, the world moves—for I believe that an authority no less respectable than Galileo so said some time since—and we who inhabit it *move with* it, and rapidly, too. We, no doubt, would realize this if we could skip off from it for a few seconds, and behold it move off from us at the rate of 68,000 miles an hour, when we would also realize that we were being "left." But we are still in the world, I am thankful to say; and are also trying in some way or another to enlighten the world.

It is a very easy thing to accuse a man of being behind the times, and it is also very easy to be wrong; but shall we say of him who is slow, because of time spent in examining closely and most carefully scrutinizing the merits of an innovation, that he must hurry up, or that he will be "left?" I think not.

I believe it was Artemus Ward who, in his desire to put down the "cussed rebellion," as he termed it, said he was willing even to sacrifice his first wife's relations in the good work. He raised a company, and they all turned out brigadier generals. We cannot all be leaders—some must follow. We cannot all be great, neither can we all be rich; but I contend we can all earn a fair and reasonble dividend on money invested in gas stock. Can this be done on money invested in electric lighting enterprises? Is it being done? If it is, then why are so many electric lighting companies asking the gas companies to buy them out?—not at a profit, and not even at cost! but on a mere percentage of their cost. As a rule, when a firm engaged in business is making a fair return on their investment, they do not desire to sell, and certainly would not sell at a sacrifice. What gas company is there that is asking to be bought out by an electric light company (or anyone else) at less than the plant cost? If the reader knows of one will he kindly confer with the writer, and a transfer by purchase may be the result—in fact will be the result.

I firmly believe the fact of the matter is there is not a fair and reasonable profit in electric lighting, and the less we have to do with it the better. One thing that I have particularly noticed among the fraternity is that the gas men whom we all acknowledge as the best informed and most thoroughly experienced exhibit the least concern as to electric lighting and its bearings on their business.

I notice recently a stir along the line of consolidation. Not being conversant with all the facts in respect thereto, I can scarcely express an opinion, but if the intention is to amalgamate the varied interests and then make such a price for the electric light as shall bring a profit to its suppliers, gas will, in many instances, take its place.

That the electric light has come to stay I am unable to deny, and have

no desire to deny it; for on the whole it has been the means of increasing the demand for gas, thus gladdening the hearts of those engaged in the gas business. The arc light came and its advent taught the public to demand a largely increased volume of illumination; next came the incandescent lamp, affording a pleasant light, though neither as good nor as cheap as gas, wherefore the demand of to-day is, "More light for less money." As purveyors of gas we propose to supply this demand. We know we can with gas furnish more light for less money than with incandescent electric light, and must stand or fall by this fact. In the meantime I venture to predict that two classes at present interested in electric lighting will, in a few years, retire from business—the electric light supply men and the electric light purveyors—the former as millionaires, the latter as beggars, unless they have a gas business to fall back upon.

In my next article I thought to speak on the management of gas works, referring chiefly to the manufacturing and distributing divisions, touching also on capitalization, legislative control, etc.

[To be continued.]

The Origin and History of the Great Central Gas Company, London.

The *Plumbers' Review* thus reviews this subject:

Up to the year 1848 the supply of gas to the city of London was practically a monopoly, in the hands of two companies—the Chartered and the City Gas Companies—and many complaints had arisen among the customers, both as to the illuminating power of the gas supplied and the price charged for it. That these complaints were not without foundation may be inferred from the fact that the citizens of London were charged 7s. per 1,000 feet for gas of an inferior quality. The dissatisfaction which was felt led to several meetings being held, in order to secure, if possible, an improvement in quality and a reduction in price.

Urgent appeals were addressed to the Corporation, requesting them to take action in the matter. Accordingly, in 1848, that body appointed a Sub-Committee to act in concert with the City Solicitor, Mr. Charles Pearson, instructing them to investigate and report upon the facts of the case. About this time I (Angus Croll) was introduced to the late Alderman Wire, as having had a long and thorough knowledge of the manufacture and supply of gas. He said that my acquaintance with the subject was practical as well as theoretical, and that my experience in many gas works had led me to the conclusion that improvements could be effected both in quality and price, equally advantageous to the producer and the consumer. Many conferences on the subject were held with Mr. Pearson, and our views were freely exchanged. The conclusions at which I had arrived, and the grounds of these conclusions, were laid before him and his coadjutors.

In a pamphlet, "Are the Citizens of London to have Better Gas?" Mr. Pearson says, "I encouraged Mr. Croll to part with his other gas properties that he might concentrate his energies to make war with the monopoly in the more extended field for his spirit and enterprise, the city of London." Statements, derived from experience, were accordingly placed in Mr. Pearson's hands, showing that pure gas, of a high illuminating power, could be supplied to the citizens at a maximum rate of 4s. per 1,000 feet.

The process of manufacture of gas was then in a very imperfect and rudimentary state. No attempts were made to purify the gas, beyond cooling it as it came from the retorts, and then passing it through lime. In addition to the low illuminating power of the gas so supplied, and the deleterious fumes exhaled by it in combustion, there was a further mechanical injury to the meters, which, as less obvious, may be briefly adverted to in passing. The impure gas, highly charged with ammonia, in combination with sulphur in various forms, had to pass through meters containing a complicated system of toothed wheels. The result was, that the brasswork of the interior was constantly found to be corroded, and the teeth of the index wheel broken off. Such was the condition of the gas that I have known the brass teeth in the index of a meter to dissolve in three months. The gas, in consequence, passed through the meter unregistered, to the serious loss of the companies; besides which there was a constant and troublesome tightening of the taps. The chief cause of this mischief was the retention of ammonia in the gas, which I set myself to remove, and in which attempt, after many experiments, I at length completely succeeded, by making the gas, in its way from the condensers to the lime, pass through a purifier charged with a solution of chloride of manganese, or diluted sulphuric acid; and at the same time I adapted the works to this improvement, which produced an almost entire cessation of the injuries to the meters and fittings previously complained of. An arrangement of supplemental flues, by which the amount of air supplied to each furnace was so regulated as to secure the adequate, but not excessive, draught for each. This, with alterations in the setting of the retorts, and other improvements, reduced the consumption of fuel from 15 to 17 per cent.

It was shown that by all these improvements, good and pure gas might be produced, which would not destroy the instruments that measured it, whilst affording to the companies the means of proportioning the payment for all gas supplied, whilst the necessary result of these things would be not only to satisfy the public, but also to enable the companies, by increased profits, to reduce the price, and by so doing, to add further to their business, and consequently to their profits.

The agitation for cheaper and better gas, which assumed so decided a form in London, in 1847, was destined to lead to the ultimate realization of the above-mentioned proposals; for the committee appointed by the City Commissioners of Sewers, having clearly ascertained that the desired improvements ought to be and could be secured, recommended that efforts should be instituted for obtaining a supply of gas in the city, at a maximum rate of 4s. per 1,000 ft., and thence, as the consumption increased, to 3s.

Meanwhile, the two old-established gas companies (the "City" and the "Chartered") reduced their tariff from 7s. to 6s. per 1,000 ft. But it was generally felt by the consumers that this was a very insufficient reduction; and from these and other circumstances it had become evident that the foundation of a new gas company was the only way by which the urgently desired advantages to the consumers could be obtained.

Accordingly, in November, 1848, the prospectus of such a company, to be named "The Great Central Gas Consumers Company," was issued. It proposed that three-fourths of the shares should be allotted to consumers, that the maximum charge should be 4s. per 1,000 ft., and that all surplus profits above 10 per cent. should be divided amongst the Company's consumers, whether shareholders or not.

The very liberal and unusual terms thus offered to the consumers and the public excited general interest and satisfaction; and at an influential meeting of citizens, held at the London Tavern early in 1849, I, for the first time, announced that I would agree to manufacture gas, at the Company's works, at 1s. 4½d. per 1,000 ft., a price lower than I had previously stated; but it ought to be known that it was never my intention to manufacture gas at that price, and also pay certain charges other than those connected with the manufacture. The price I had estimated for the supply of gas, at the Company's works, was 1s. 6. . . . (Mr. Croll proceeds to describe the opposition which was encountered against the establishment of the Company, which is now not worth repeating); but at length "The Great Central Gas Company" was established as a registered company, in September, 1849, and thereby obtained most of the advantages that a special Act could furnish, except the power of compulsorily carrying their operations, or mains, through any property whose owners were unwilling to consent;* and then began the real difficulties which the promoters had to contend against.

The first step was to obtain the consent of the City Commissioners of Sewers for the breaking up of the streets and pavements, in order to lay down the gas pipes. For this purpose it was necessary to institute a thorough and complete canvas of the whole of the inhabitants and householders of the city of London. For this purpose Mr. Croll decided to avail himself of the existing political organizations which were already in efficient working. The three parties, Conservatives, Liberals, and Advanced Liberals, had each of them its own agency, consisting of a secretary with a staff of men working under him, who knew and had access to every individual belonging to their party. He therefore saw the three secretaries, and engaged them and their staff, in the work, for a period of three months.

In November, 1849, a general meeting of gas consumers was held at the London Tavern, when a resolution was unanimously passed, requesting the Commissioners of Sewers to grant the requisite permission. On December 3d the Board of Sewers met. Of 51 members present 38 voted in favor of the application, and 13 against it. A majority of 25 therefore placed the Great Central Company in a position to go forward with vigor, after all its delays and struggles for very existence.

A heavy blow, and one which almost proved fatal, however, fell upon the Company immediately on the chief obstacles being removed. The very next day after the favorable decision, the old City Gas Company announced that they would reduce their gas to 4s. per 1,000 feet. This, as might be expected, greatly disconcerted the Directors and shareholders of the Great Central. At the same time, overtures for a compromise were made to the new company by the old ones, but conditional on the suspension of all operations by the former. So adroitly were these over-

* At that period, the present Limited Liability Companies Act had not been passed.

tures managed, that at a meeting of the Directors of the Great Central a resolution was agreed to for winding up the undertaking. This was indeed the crisis of the Company. The promoter succeeded in getting the entry of his resolution on the minute book delayed. In the evening, after the Board had separated, he took a cab and waited on each of the Directors individually in order to induce them to reconsider their decision. This attempt was successful. At the next meeting the previous determination was rescinded, and it was concluded still to persevere.

The early part of 1850 found the Great Central Company about to commence its real working operations. Much time and thousands of pounds had been consumed in overcoming opposition, but the crisis was passed, and the final issue of success began to loom in the future with assuring clearness.

It was eventually concluded to erect the new gas works at Bow, on a site which had the disadvantage of being two and a half miles from the city precincts, thus involving very heavy expenses in laying down the connecting mains. After much negotiation, contractors were engaged to erect the works upon a scale of prices agreed upon, but it soon became evident that the Company was to be involved in new difficulties by the reluctance of these contractors to proceed with the work; and the blow appeared to fall with disastrous weight, when, early in 1850, they refused to carry out their contract. The seriousness of this position may be estimated when it is considered that the Company had contracted with 4,900 customers to supply gas in September of the same year. Fortunately, however, other contractors were found, and matters having been again arranged, work was commenced in the beginning of March, 1850, and carried on most vigorously.

The Company was now in possession of most of the powers needful to enable them to complete their undertaking, but many vexatious and useless delays had several times to be contended against. During the next three months mains had to be laid over sixty miles of streets, and the difficulty of completing so great a work in so short a time was greatly increased by the necessity imposed upon the engineer to carry on the work in the principal thoroughfares only at night, so as not to impede the traffic.

Throughout August and September, 1850, the works were pushed on with vigor by day and night in order to permit the Company to fulfil their contracts with consumers. It was the general public belief that it would be impossible to implement these engagements, but by the middle of September the great advance that was being made could no longer be concealed from the eyes of opponents, for by that time the pulling up of the streets had become excessive, and there was scarcely a street or alley in the Company's district that had not been torn up from end to end. At length, on September 14th, the Chartered Gas Company applied to the Court of Chancery for an injunction to prevent the laying down of pipes by the side of or across their mains; but this step was taken too late, for whilst the lawyers were discussing the question on both sides, the work was so far completed, by means of additional energy, that further proceedings were dropped as being useless.

The next impediment was the "Battle of the Bridge" at Bow, which was offered to the new Company's progress outside the city precincts. A portion of the line of route where mains had to be laid lay through a district under the control of the Middlesex and Essex Road trustees, who refused their permission for the needful opening of the thoroughfares. The Company was thereby necessitated to take a somewhat circuitous route along back streets and narrow bye-ways, in some of which it was necessary to lay the mains seventeen feet below the surface. It was also necessary to cross a canal, over which there was a narrow bridge, along which a 3-inch main had previously been laid by the Commercial Gas Company.

At this time that Company proceeded to lay an additional 10-inch main, up the bridge on one side, across it at right angles, and down the opposite side, connecting it also with the smaller main at each end. Although the Commercial Company possessed the right to lay gas pipes upon this bridge for the supply of the district, they had no right to open the ground for this purpose without giving three days' notice of their intentions to the local authorities. They failed to give this notice until they commenced the work, so that the opening of the ground and giving the notice were simultaneous. Inasmuch as the only way in which the works at Bow could be connected with the city for the supply of gas was over that bridge, this serious obstructive action on the part of the Commercial Company was immediately known to the writer, whose eye rested upon the bridge as he passed it day by day with considerable anxiety.

A meeting of the local authorities was therefore called for the following evening, when Mr. Pearson made a powerful appeal to the parish Board. The Board, having previously given permission to the Great Central Company to lay down their mains in every street and lane in the parish, were indignant at this attempt to frustrate their previous decision. A special committee was appointed to meet the writer next morning at 5.30 A.M., with power to do all that was necessary to aid in removing the obstruction, and give the Company possession of the bridge so as to enable them to lay their mains. This committee, who were full of ardor and patriotism on the previous night, were unwilling in the morning to do any one single act to aid him, beyond going through the farce of ordering the beadle to remove the mains, which he proceeded to do by taking a shovel in his hands. The Secretary of the Commercial Gas Company placed his hand upon the beadle's shoulder, and this was considered an assault. Summonses were then to be applied for for this assault, and the whole matter argued before a judicial tribunal. It was vain for the writer to argue with these gentlemen; therefore, mentally deciding upon another course, he quietly left the ground.

The Commercial Gas Company now blocked up the bridge at each end with thick planks 10 ft. high, with strongly-guarded wicket entrances, and posted a party of 200 men, well supplied with food and liquor, inside the barriers and in possession of the bridge.

It was absolutely necessary for the Great Central Company's main to cross this bridge before another day passed, for the three days' notice which the Commercial Company had given for the opening of the ground would have expired, and they would, at the expiration of the notice, have had legal possession of the bridge, which at that time they did not possess. It was therefore resolved to carry it by a sudden onslaught, at whatever cost. Accordingly a number of wagons were quietly laden with pipes, chains, slings, crowbars, planks, picks and shovels. Four powerful horses were then harnessed to each of the wagons, which were forthwith started at full speed, with a large body of picked navvies in each. Fortunately these arrived at the bridge at an unexpected moment, when a number of its defenders were scattered in neighboring beer-houses. The advanced guard having removed the strong boardings previously erected, the whips were vigorously applied to the horses, and, with a loud hurrah, the bridge was taken. Hammers and crowbars were speedily in operation, chains were looped on, horses attached, and the whole of the obstructions were dragged over the bridge and thrown into an adjoining field. The wagons were placed across the bridge at each end and strongly barricaded, and the whole vigilantly guarded.

The outposts who penetrated into the enemy's camp learned that it was determined to retake the bridge that afternoon, and for that purpose to employ a thousand men, dock laborers and others. This information was considered so serious that the writer immediately went to the Thames police court and made a declaration of the state of affairs, and of the danger that might result to life unless the magistrate gave him the protection of a large body of police. The magistrate at once despatched as many men as he could spare. A similar application was made to Scotland Yard, and the small army of defense was then reinforced by a large number of police, some of them mounted, two inspectors and a superintendent. The writer thereupon retired to his headquarters with feelings of perfect security, the mounted police reporting, from time to time, that the enemy had not shown himself in any direction. Thus ended the "Battle of the Bridge," a description of which was written by a director of the Great Central Company, in the form of a parody of Macaulay's "Lays of Ancient Rome." It is too long to quote, but a specimen will show the style:

"Uprose the mighty barricade,
Of wagon, plank, and chain;
Up went the poor Butlerian pipes,
Down went Dakinian main;
And then three wild tumultuous cheers
Were shouted back again."

The lay concluded thus:

"For ever in the gaseous war
May Crollius general be;
And when again he leads his men,
May I be there to see."*

By the middle of September the new Company were able to commence the manufacture of gas, and on Saturday, September 28th, 1850, the valves of the works were opened and the gas sent forward. Meanwhile, although the regular supply of gas had commenced, the works were by no means complete. Only one-third of the gasholders, retorts and purifiers were in working order, and the paving was scarcely begun. The necessary offices and shelter for the workmen were also unfinished, and for a time every comfort and convenience was sacrificed to the one object of maintaining the supply of gas. At the half-yearly meeting of

*Mr. Alderman Dakin was Chairman of the Great Central, Mr. Butler holding the same position in the rival company.

the Great Central Gas Company, held October 30th, 1850, it was announced that 4,660 services had been laid on, and that 15,000 of their lights were burning on the premises of the consumers. By the end of the same year the Company were already fulfilling the promise of the original prospectus—the supply of pure gas to the public at 4s. per 1,000 feet, and at a good profit also to the shareholders.

A Tall Chimney Shaft.

Mr. R. M. Bancroft, in writing about a chimney shaft recently constructed for the Hornsley Local Board (England), to be worked in connection with its sanitary depot for treatment of house refuse, thus describes the structure:

The principal dimensions are—

	ft.	in.
Total height from bottom of foundation to top of capping	244	0
Height from ground line to top of capping	217	0
Outside diameter at ground surface	18	3
Inside diameter at ground surface	12	3
Outside diameter at top, under capping	8	6
Inside diameter at top, under capping	6	3

The bricks used in its construction were good London stocks, 9 in. by 4½ in. by 2¾ in., and the work throughout is laid in English bond, with Dorking lime mortar in the proportion of three Thames sand to one lime. No grouting was used in any part of the construction.

The foundation-bed is clay 27 ft. below ground line. On this a block of concrete was formed, 39 ft. square and 16½ ft. deep, composed of six parts Thames ballast to one of Portland cement.

The brick footings in cement are 33 ft. square at base, and built up to ground line, which is 10 ft. 6 in. from top of concrete bed, with regular offsets of 2½ in. by 6¾.

The shaft proper, starting from top of footings, is built up in six sections, commencing at the base:

	ft.	in.		
First section	30	0	×	4 bricks.
Second "	34	6	×	3½ "
Third "	34	6	×	3 "
Fourth "	37	0	×	2½ "
Fifth "	37	0	×	2 "
Sixth "	21	0	×	1½ "
Seventh (cap)	23	0	×	2 "
	217	0		

The cap portion, which is constructed in white glazed and blue Staffordshire bricks, is surmounted with a circular cast-iron capping weighing 22 cwts., cast in six segments, and bolted together by internal flanges, and forms a very good finish to this tall shaft.

A fire-brick lining, or inner shaft, is built up to a height of 60 ft., the lower 30 ft. in 9 in., and the upper in 4½ in. work set in fireclay. An annular space of 15 in. is left at the base, between the fire-brick lining and the main shaft, to admit of expansion in the fire-brick. The top of lining nearly touches the main shaft, which is corbelled over to fire-brick lining to prevent any deposit accumulating in the annular space. Cast-iron inlets, 9 in. by 6 in., are provided at ground level to admit cold air, and to prevent the inrush striking the fire-brick lining; a 4½ in. brick pier, 2 ft. high, is built between the two shafts.

Two rings at the base and one towards the top of hoop iron bonding, 1½ in. by $\frac{3}{16}$ in., are built in main shaft, about every 3 ft. 6 in. in height.

The connection between flues of boilers and furnaces with main shaft is made by an arched flue opening, 9 ft. by 3 ft. 3 in. at the base, and a soot-door is also provided, whereby access can be obtained to the inside of shaft when required.

The time occupied in building this shaft was a little over five months, commencing in July and finishing in December, 1888. The bricklaying was continued all through the foggy weather in the latter month, the workmen having a clear light at about 150 ft. high, although they could not see the ground through the fog below.

A lightning conductor is fixed to the shaft, composed of two copper tapes or bands, 1½ in. by ¼ in., winding spirally round the outer circumference to under side of cap, where they are connected to a ring encircling the shaft, and from thence No. 6 copper rods, 1 in. diameter, are carried to a height of 4 ft. above the cap, and terminating with crow-feet ends. The tapes are joined at a distance of about 40 ft. from the base, north of the shaft, and 18 ft. below the ground level, and terminate at a copper earth-plate, 3 ft. by 2 ft. by ¼ in.

Outside scaffolding was used, and, as a testimony to the careful manner in which the work was carried out, I may state that no accident whatever occurred during the construction. The shaft forms a conspicuous landmark to the surrounding locality, and dwarfs all other similar structures for miles around.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Jamestown (R. I.) Council has passed a resolution to permit the Jamestown Water and Light Company to lay mains through the highway for the purpose of furnishing the town with water and light, the grant to live for 30 years, the terms of charge for the supply to be adjusted at a subsequent Council meeting. Jamestown is on Canonicut Island, and is about 4 miles west by north of Newport. It is a small place.

AT the annual meeting of the Easthampton (Mass.) Gas Company the chief business transacted was the declaration of a 5 per cent. (semi-annual) dividend and the election of the following officers: Directors, E. T. Sawyer, Jno. Mayher and G. P. Leonard; President, E. T. Sawyer; Clerk and Treasurer, H. S. Clark.

MESSRS. R. D. WOOD & Co., of Philadelphia, are in charge of the following construction work on the plant of the Gate City Gas Light Company, Atlanta, Ga.: A single-lift holder, 75 ft. 6 in. diameter by 20 ft. in height, and a set of purifiers, 10 ft. by 12 ft. by 3 ft.

WHEN the present improvements on the Huntsville (Ala.) plant have been completed the proprietors will be in position to meet the demands of their customers for more light. The task virtually amounts to replacement, for a complete 10-inch plant is to take the place of the old 6-inch one. The storage capacity is to be augmented by the erection of a single-lift holder, 80 ft. diameter by 22 ft. 6 in. in height, provision being made for the addition at any time of a second lift. Col. Coxe and his son Davies have great faith in the future of Huntsville, a faith, by-the-way, largely shared in by many less interested judges.

HAPPENINGS AT LOUISVILLE, KY.—Some time ago we noted the rather awkward position in which Engineer Barret, of the Louisville Company, was placed through the cowardice of the contractors who, when water made its appearance in great volume in the excavation for the Company's new triple-lift holder, refused to go ahead on the work. If we mistake not we said at the time that Mr. Barret would complete the tank even if a branch of the Ohio river were encountered in the pit; and we may now add that the work is practically completed. At one time he had 16 feet of water to contend with at the inlet connections, and the entire bottom of the pit may be said to be little else than a spring, and a lively one at that. The wall is completed and the floor is being laid. At the annual meeting of the Company for reorganization under the new charter (the officers hold over until July) it was determined to make provision for a large modern purifying and scrubbing plant. In accordance with the suggestions submitted by Mr. Barret to his superiors, he has been empowered to construct a plant that shall be equal to the rapid and perfect handling of from 2 to 2½ millions cu. ft. per diem. It is proposed to place 4 oxide boxes, supplemented by two lime boxes, all transportation of material to be performed by machinery, and the same principle to rule, as far as possible, in the charging and discharging of the lime and spent material. The scrubbing apparatus is to be on a scale commensurate with the purifying provision, and there is little doubt that when the apparatus is in working order the Louisville Company will be able to satisfactorily compare notes with any other gas company in the country with respect to the completeness of its apparatus. Last year the Company made a gain close to 10 per cent. in send-out, and this despite the frantic efforts to secure business by the local incandescent electric lighting company, which will accept a contract at the prospective patron's own figure.

APROPOS of this liberality on the part of the Louisville electricians, which is only a sample of that which may be witnessed in many other sections of the country, certain reports lately brought (unfortunately, however, in a privileged manner) to our notice of the cost to gas companies of operating an electric annex, seem to bear a close resemblance, in the estimate of working expenses for the year, to the figures made to us years ago by a good housekeeper, who made a great fuss over the small first cost of a cake that she had made. When interrogated as to the cost of the marvel her reply was that it cost but 20 cents. The 20 cents went to the purchase of allspice, the good lady explaining that she "had everything else in the house."

WE understand that a certificate incorporating the Eureka Gas Light and Fuel Company, of New Jersey, was filed at Trenton on Jan. 31. The incorporators are Levi Stevens, Benjamin M. Phillips, Jas. F. Brooks, A. M. and C. S. Maddock, and Lewis Lawton. The objects as set forth are, "The manufacture of appliances to be used in the manufacture of illuminating gas, for improvements in boilers, furnaces, and processes for burning petroleum and for utilizing gas coal and oil for heating and illuminating." The Company is capitalized in $200,000, of which $197,500 stands in the name of B. M. Phillips.

AT the annual meeting of the Wallingford (Conn.) Gas Light Company the following result was reached: Directors, Col. W. J. Leavenworth, Capt. B. A. Treat, and Messrs. Gurdon W. Hull, W. C. McClalland, and L. M. Hubbard. President and Treasurer, Col. W. J. Leavenworth; Secretary, L. M. Hubbard; Supt. Fred. H. Lane.

THE "Ideal Lime and Stone Company," E. Duff Slaymaker, Managing Director, reports good success in the reduction of limestone by means of producer gas. The experimental kiln is located in Texas, Baltimore county, Md.

ONE result of the absorption of the Laconia (N. H.) Electric Light Company, by parties interested in the local Gas Company, and the subsequent (1887) incorporation of both concerns under the title of the Laconia Gas and Electric Light Company, has been to awaken the gas proprietors to the fact that the existing gas plant is entirely inadequate to the duty imposed on it. This knowledge, which should have been theirs years ago, caused them to draw up plans for a new works (to be located between Laconia and the adjoining hamlet known as Lake Village), on a scale equal to the conditions. The main building is to be 70 ft. long by 43 ft. wide, with a boiler house annex 30 ft. by 12 ft., for the housing of the manufacturing plant, the latter to be complete in every detail for the production of water gas. The storage capacity is to be equal to the reception of 40,000 cu. ft., and the oil is to be stored in two tanks, each to have a capacity of 5,000 gallons. A coal shed, 50 ft. by 19 ft., also figures on the plans. This work involves an expenditure of $50,000.

WE note in General Wagner's report to the authorities concerning the operation of the Philadelphia Municipal Gas Works for the past year, that Chief Park recommends the purchase of an additional exhauster of the Wilbraham type.

MAYOR OLIVER, of Lockport, N. Y., still hankers after a municipal electric lighting plant, but our impression is that his desire does not grow with the closing days of the 19th century. He, however, is "pointing with pride" to the fact that his "determined effort" has brought the local gas company to its senses—we may be forgiven for holding that, unlike Mayor Oliver, the company kept pretty cool during the period of disturbance—in that the latter has offered to furnish the authorities 120 arc lights, at the rate of $80 each per annum, moon table. The present price is $55 apiece higher. Another concern, however, offers to supply a "light service, equal to the requirements," for the gross sum of $6,300 a year. Quite likely the latter would be a "light" service in more senses than one.

SOME time ago the Norwich (Conn.) Company's indefatigable Supt., Mr. Gilmor, completed a relief holder for equalizing the distribution in the district. In order to make the new vessel fully equal to its task both holders have been connected by an exhauster.

THE Westinghouse canvassers have been attempting to show what a blessing it would be to Rochester (N. Y.) if their Pittsburg employers were allowed to establish a plant in that city. Whether Rochester would or would not be blessed by such an undertaking is, of course, an open question; but that the permission would mean money to the Westinghouse faction is quite an assured thing. The canvasser attempted to interest certain members of the Rochester Chamber of Commerce in the scheme—*i. e.*, as to the investment of money in the shares—but does not seem to have been received into open pockets, as it were; for Secretary McClintock, of the Chamber, thought he (the canvasser) would find difficulty in inducing people to subscribe. Rochester, if we mistake not, has been blessed before, and the laying on of hands does not seem to have strengthened its faith, in electricians, at any rate. The scheme involved the establishment of a 3,000-light plant.

AT the annual meeting of the Malden and Melrose (Mass.) Company the stockholders were told that their liberality in reducing gas rates in the past year had had a most gratifying result. This is perhaps best shown in the fact that 5.12 per cent. represented the increase in sendout in '87 over '86; whereas 10.2 per cent. stands for the actual increase in '88 over '87. The main system was bettered by the addition of 5½ miles of mains, and other improvements were paid for out of earnings. The balance, however, permitted the declaration of a 6 per cent. dividend, and these considerations evidently disposed the shareholders to again relegate the management of their affairs to those who had been so watchful of their interests. Whether so or not, the former officers were all chosen to succeed themselves, the *personnel* of the management being appended: Directors, J. T. Foster, G. D. Bill, D. Russell, J. H. and E. S. Converse, D. P. Cox, L. P. True, and D. W. Gooch; President, J. T. Foster; Treasurer, Geo. D. Bill.

TREASURER HALLETT, of Springfield, Mass, has again rendered an account of his stewardship, and last year, luckily untroubled by the travail attending an effort to repress the opposition attempts of certain gentlemen who stand sponsors for infantile gas processes, he comes out in great feather. At the annual meeting of the Company his yearly report proved the gain in sendout to have been 9.90 per cent., whereas the gain for '87 had been but 5.41 per cent. The net gain in individual meters set is returned at 173, and two miles of additional mains were laid. The candle power for the year averaged 18.24; in December it averaged 19. In the Company's main laying operations it might also be noted that many of the smaller pipes were replaced by those of greater diameter; these substitutions being necessitated because of the constantly augmenting demand for more gas from the residents on the Hill and North End districts of the city. The Directors chosen were Messrs. M. Chapin, E. Gunn, J. A. Rumrill, H. S. Lee, S. W. Porter, L. Corcoran, M.D., W. H. Wesson, W. H. Haile, and J. L. Hallett. The organization meeting resulted in somewhat of a surprise, in that the Directors were confronted with a declination from Mr. Marvin Chapin to accept a re-election to the Presidency. Mr. Chapin was first chosen President in 1861, and served as such until 1870, when he was succeeded by the late James M. Thompson. On the death of the latter Mr. Chapin again resumed the Chair (1884), retiring therefrom on the 2d inst., to be succeeded by Mr. W. H. Haile. One notable thing in connection with this Company is that during its 41 years of life it has had but four Presidents, who, with their respective terms of office, are named below:

Solyman Merrick	1848–51
James D. Brewer	1851–61
Marvin Chapin	1861–70
James M. Thompson	1870–84
Marvin Chapin	1884–89

No other change in the management occurred. Prior to adjournment the Directors presented the following testimonial to Mr. Chapin:

"*Whereas*, Mr. Marvin Chapin, the President of this Company, who for years has been connected with the management of its affairs, informs us that he cannot accept a re-election to the position now held by him, and insists that another be chosen in his place;

"*Resolved*, That the Directors of the Springfield Gas Light Company hereby express their regret that Mr. Chapin's decision compels them to elect a President in his stead; of their appreciation of his valuable services during the many years he has been connected with the Company; of his devotion to its interests, and of the benefits which have resulted to it from his efforts in its behalf; that they recognize the obligation that the Company and its stockholders are under to him, and assure him that his labors in their behalf will ever be held in grateful remembrance."

THE works of the Northampton (Mass.) Company were damaged a few days ago by an explosion. The loss may amount to $600.

ONE of the smart young men connected with the Fishkill (N. Y.) *Daily Journal* received a practical illustration the other day of the expansive and explosive qualities inherent in a properly combined charge of illuminating gas and air. A compositor in the office detected the presence of gas in the air of his alley, and properly sent for a plumber. A clever young man, however, thought that was a waste of time, and so it was; for the young man at once found the leak—with a match. He won't injure his mustache for a month at least when his cigarette gets down close to the vanishing point.

THE price of gas coke in Wilmington, Del., is reported at $2 per ton.

MR. KENT, of Cook county, Ills., has introduced a bill in the Illinois Legislature, which provides that where gas fixtures or other plumbing work in a hotel is defective the landlord shall be liable for all injuries occasioned thereby to the health of his guests.

FROM the annual report (1888) of Mr. Chas. W. Hinman, Inspector of gas and gas meters in the State of Massachusetts, we glean the following: Meters inspected, 13,579; of which 56 registered fast, with an average error of 5.22 per cent.; 17 were slow, with an average error of 8.71 per cent.; 2 meters failed to register at all. The average candle power at the named points was shown to be:

Boston	18.39
Brookline	18.44
Cambridge	17.58
Charlestown	17.47
Chelsea	18.13
Dorchester	17.59
East Boston	17.72
Jamaica Plain	17.83
Lynn	18.01
Malden	17.43
Newton	17.51
Roxbury	18.10
Salem	18.32
South Boston	17.69
Waltham	17.62
Springfield	18.24

The gas at Amesbury, Cottage City, Fall River and Spencer contains a higher percentage of carbonic oxide than that contemplated by the regulations.

THE Cleveland (O.) *Leader* says that the following amounts were paid to the various companies for public lighting in 1888: Gas companies, $82,478; gasoline lighting contractors, $43,328; Brush Electric Light and Power Company, $17,353.

THE beer barons of New Jersey, not satisfied with their attacks on the law and order policy which seeks to restrain unbridled license within that State, are turning their attention to the restriction, so to speak, of the gas interests. This seems to be so from the fact that last Tuesday Assemblyman Wiedenmayer, of Newark, who is a "boss brewer," introduced a bill in the New Jersey Legislature, which proposes to abolish meter rents and to prohibit gas companies from requiring a cash deposit from those about to become consumers of gas. A second measure provides for the appointment of gas inspectors for all the large cities, the Governor having the appointing power, and the term of office to be five years. Now we do not know how general the practice of collecting meter rents is among the gas companies of New Jersey, but imagine that it is a practice more honored in the breach than in the observance; further, we incline to the view that meter rents are not conducive to smooth relations between the company and its customers, and so believing, submit that their abolition would be a good thing. The first charges and subsequent ones for repairs to meters ought to figure in the distribution account, and so be included in the cost of gas to the consumer, for in this policy the gas man would merely follow the practice instituted and pursued by the proprietors of our "infant industries" that are swaddled up in the warmth of high tariff. Our high protectionists insist that high tariffs guarantee good wages to their workmen; but when the "good-waged" workman comes to pay for either his working blouse or his Sunday coat, each bears its quota of the tariff that protects the "swaddled." Still, the second clause, denying the right of a gas company to exact a deposit in the nature of a cash guarantee that the consumer will pay his gas bill, is an entirely different matter. Take, for instance, the very class out of which brewer Wiedenmayer makes his profit—the saloon keepers. As a class, they are not unprofitable customers of a gas company, but some, in fact many of them, are doubtful quantities. If the new "corner" proves to be a success, the gas man is pretty certain of his money, but if the "corner" does not do well, the gas man is sure to be cheated—unless the "corner" proprietor's cash deposit is safe in the hands of the gas company. A law permitting a company to exact a deposit does not imply that that deposit will be exacted in every instance, but it does stand as a safeguard against the demand of one who is a doubtful quantity in the matter of financial resource. Apart from these things, deposits with gas companies are entitled to the full legal rate of State interest, and such deposits are not desired by gas companies; for the interest rate obtained by the latter on their cash balances is far below that reaped by the depositor. The deposit is only asked for from those who are of doubtful ability to pay for what they purchase, and all will admit that it is better to suffer a loss of perhaps two per cent. on the interest rate, rather than to lose 100 per cent. of the principal. In any event, we do not think the New Jersey gas maker will be greatly put out by brewer Wiedenmayer's attitude in respect of meter rents. In fact, we make no doubt that a measure like the one proposed at Trenton would not stand the test of authorized judicial opinion. In the matter of the appointment of gas inspectors we see no reason for objection. Quite to the contrary, we believe it would be a benefit to the gas companies that such officials held office in every large city of the country, provided the salaries of such inspectors were not provided for by direct levy on the treasuries of the gas companies. It would seem strangely unjust to the importer were he called on to pay directly the salary of the appraiser who estimated the value of the silks that were consigned to him, still the average legislator and his ally, the average citizen, see no oddity in providing that the salary of the man who appraises their gas or testifies as to the accuracy of their meters shall be paid directly by those who manufacture the one and provide the other.

THE proprietors of the Penn Yan (N. Y.) Gas Company have decided to remodel and equip their works with a complete coal gas apparatus, and the Kerr Murray Manufacturing Company, Fort Wayne, Ind., has secured the contract therefor.

THE Wilmington (Del.) electricians have decided to abandon the practice of charging a stated amount per month for each incandescent lamp supplied. At least Mr. J. A. Lighthipe, who manages the City Electric Light Company there, says he is about to introduce "an electric meter that will record the use of the current exactly as gas meters measure gas." Perhaps so, Mr. Lighthipe; perhaps so.

LAST week a bill was introduced in the Pennsylvania Legislature which provides that any gas company, or company incorporated to supply light, heat and power by electricity or other means, shall have the right to enter any public street, lane, alley or highway, subject to the regulations of the municipality, and that exclusive rights in the district covered by the charter are to be granted until the company shall have earned and divided 8 per cent. on its capital stock for 8 years. We presume this measure is intended to apply only to such companies as shall be incorporated hereafter to operate in districts not now covered by grants for the objects named.

Is it not about time that the City Council, of Hamilton, Ohio, either went fishing or started on a bait hunting expedition in the matter of the local gas supply? Some people out that way are beginning to feel a strange weariness stealing over them in connection with this imbroglio.

LAST week we noted that Chas. J. Whimple and others had been granted a concession by the Mexican authorities to operate gas works at various points in that State. Since then a permanent organization was effected in the Sherman House, Chicago, the officers chosen being the following: President, F. D. Dewey, Owosso, Mich.; Vice-President, D. L. Davis, Pontiac, Mich.; Secretary, M. M. McBain, Owosso, Mich.; Treasurer, J. L. Norton, Pontiac, Mich. These, together with C. J. Whimple, City of Mexico; F. M. Carleton, Chicago; and J. H. Hardy, St. Louis, Mo., compose the Board of Directors.

FROM the annual report of Jas. Gilbert, Gas Inspector for Omaha, Neb., we learn that he inspected 888 meters during the year; that 68 new gas and 79 new gasoline lamps were put up; that the cost of gas to street lamps aggregated $22,025.50; that the 1,289,200 cu. ft. of gas consumed in the public buildings cost $2,578.40; and that the city now has in use 739 gas and 507 gasoline lamps.

THE electric plant now being installed on the premises of the Rome (Ga.) Gas Company is rated to a capacity of 600 incandescent and 70 arc lamps. The latter are to be furnished from two 35-light dynamos.

ALDERMAN WETHERELL'S experimental determination of the cost and lighting volume of an ordinary Chicago public oil street lamp, reported in our last, seems to have nerved on to more ambitious deed a suburban Councilman, Mr. W. W. Hodgdon, of the Lake View district. Perhaps the force of the views of reformer Hodgdon will lose nothing of their strength if we repeat them as they were delivered at the head of an unfortunate young man who represents the *Inter-Ocean*. Here they are—the views, that is: "In June, 1887, I went into the Council" (Hodgdon is the man who introduced to the Legislature a bill to authorize the cities and villages of Illinois to construct and operate municipal gas and electric light works). "I was made Chairman of the Committee on Gas and Street Lighting. I immediately began investigations to see if there was not something which could be done by the city to manufacture its own gas, and furnish it at a less price than now paid to private corporations. My investigation of the different processes of making gas, and of the modern improvements in its manufacture, showed a very large margin

at existing prices. I went East and looked the matter up very fully. Before bringing the matter up in the Council, however, I had figures from the builders of gas works of different kinds, and by reckoning in the cost of plant, fuel, running expenses, and everything, I found that gas for fuel and light could be furnished to the consumer at 50 cents per 1,000 cubic feet, and then leave a large profit to the city. There would be enough profit from private consumers, figuring on the basis of the number of meters then in use, to more than pay the cost of lighting the city, so that practically the city would get its gas for nothing. I was not laughed at" [a sample of the usual unfitness of things], "for by the most careful figuring, even estimating everything high, we could make the actual net cost to the city to furnish gas at the burner to consumers only 24 cents a thousand cubic feet. You can see what the profit would be at 50 cents a thousand. I was led to precipitate the matter in the Council by the appearance of parties who asked a franchise for lighting the streets. In opposing them I had to explain my plan, and stated the amount which the city would save by building and operating gas works as it does the water works. A special committee was appointed to investigate the matter, who subsequently reported in favor of my project. The bill at Springfield was introduced as an enabling act to allow us to proceed. The city of Jackson, Mich., has now a plant which is furnishing gas for fuel at 30 cents a thousand, and for lighting at 40 cents. The gas we propose is not a luminous gas in itself. An incandescent burner must be used. Under the old process a ton of coal yielded only about 10,000 feet of gas; now they make from 40,000 to 60,000 feet per ton. The ordinary gas now in use is seven-tenths water gas. The gas used with the incandescent burner is all water gas. It is much hotter than ordinary gas, and is, therefore, better for fuel; while with good incandescent burners it gives a light equal to or better than the incandescent electric light. It is said by some that this gas can be made and served at an actual cost of from 8 to 10 cents per 1,000 feet. I know that the Company at Jackson, Mich, is making money and giving a splendid light at 30 and 40 cents per thousand feet," etc. We believe this to be sufficient to show the Hodgdon knowledge, and we have only to remark that since he knows so much about the Jackson Company's business, if he wants to secure some stock in that concern, at a very reasonable figure—from his point of view the quotation ought to seem an exceedingly low one—we think we know where he can be accommodated. In the meantime we would recommend Mr. H. to look over our catalogue of works on gas and gas manufacture. He would certainly there find something that would show him how little he knows about even the rudiments of a business which he now proposes shall become part and parcel of the municipal system of Lake View.

THIS is submitted for what it is worth; it is forwarded us by a correspondent who has a keen sense of the humorous, and who knows both parties to the dialogue: Parties to the scene, Mr. Ed. Butler, of St. Louis, and Socrates Newman, who requires no further introduction to the gas men. Butler: "When the price of gas was reduced in St. Louis from $2.50 to $1.50 per 1,000, I, at the end of the first year, went over my books and compared my bills with those of the preceding year. I burn a great deal of gas at my house, at the Standard Theater and in my six horseshoeing shops, and although I had the benefit of $1 reduction per 1,000 feet, the total of my bills for $1.50 gas for one year only fell $4.30 below my bills for $2.50 gas for the same period. With my figures all arranged I called on Soc. Newman. Having looked at the rows the latter sighed and remarked: 'I have no doubt but that is all correct. You, however, put yourself to a lot of unnecessary trouble. We could have given you those figures from our own books; being a stockholder you have the right to demand any information of this kind.' 'But,' said I, 'I only wanted to show you that there has only been a saving of $4.30 on an entire year. Is this what cheap gas amounts to?' Soc. smiled and replied, 'As a consumer of gas I have no doubt but that you find the figures somewhat discouraging, but as a stockholder in the gas company you should be pleased with the showing.' I retired at once."

THE electric plant recently installed by the Dedham and Hyde Park (Mass.) Gas and Electric Light Company is now in working order. The Ball system is used, power being furnished by an Otto gas engine.

WE understand that the Committee on Street Lights, Gloucester, Mass., has decided not to continue the arc system. Cause, expensiveness of the plant, and but little money in the treasury.

ANNUAL MEETING, SAN FRANCISCO, CAL.—At the annual meeting of the San Francisco Gas Light Company, about 80 per cent. of the capital stock was represented. The election resulted as follows: Directors, E. E. Eyre, Adam Grant, J. B. Crockett, Levi Strauss, James M. Donahue, D. T. Murphy, and A. H. Payson. J. B. Crockett was elected President; E. E. Eyre Vice-President, and Wm. G. Barrett Secretary and Treasurer. President Crockett, in his annual report, called attention to the operations of the Company for the past year. At the beginning of the year the Company contracted with the Renton Coal Company for the delivery of 3,000 tons of coal per month, at $5.80 per ton. Early in the year the contract was suspended, owing to a strike. A compromise was effected, and pending a settlement the Company purchased 20,000 tons in open market. Ten thousand tons were sold back again at a profit of $15,750. The average price paid for coal during 1888 was $7.63 per ton. The average price paid in commercial circles was $10.50. The number of new meters put in during the year was 5,052; number removed, 3,691; net addition, 1,361. Nearly 20 miles of new mains were laid. The yearly balance-sheet presented by the Secretary showed: Assets, $7,169,630; liabilities, $241,077; net resources, $6,928,553. The available assets aggregate $573,250. The contract with the city was renewed last August for two years at 12 cents per street light per night.

MR. C. H. MALIN, of Fort Scott, Kansas, acting on behalf of Philadelphia capitalists, has arranged for the purchase and consolidation of the gas, electric light and water supply interests of Independence, Mo. The new proprietors will expend upwards of $100,000 in betterments to the several plants thus acquired. There is every reason to suppose that Mr. R. D. Wirt will continue in the management.

AT a meeting of the Gas Committee, Select Councils of Philadelphia, it was decided to add 1,000 gas and 800 gasoline lamps to the city's public lighting equipment. We understand that Director Wagner will authorize the construction of a three-lift holder at the Mifflin street works, and that a stack of 24 benches of 6's will be added to the carbonizing plant at the same point. It is also proposed to lay a 30-inch main from the 26th ward works to Broad and Mifflin streets, through Passayunk avenue.

THE Dauphin County (Pa.) Court has been listening to evidence for the purpose of determining whether electricity as supplied in the State of Pennsylvania for light, heat and power, is to be regarded in point of law as a "manufactured" or "natural" article. President Morton, of the Stevens Institute, Hoboken, N. J., was one of those who gave testimony in favor of the "manufactured" view. Argument will not be made in this case until the March session. The pith of the case is that, under the Pennsylvania statutes, acts of 1885, manufacturing companies are exempt from certain taxes.

THE electric system (incandescent, Westinghouse type) put in by the Burlington (Vt.) Gas Light Company was satisfactorily initiated on the evening of the 1st inst.

MR. W. E. CLARK, of San Francisco, Cal., is installing a 35-light arc plant of the Waterhouse type for the Chico Gas Company.

MESSRS. JAS. AND WM. WOOD, of London, Glasgow and New York, have control in this country for the sale of the Fairmount Company's West Virginia gas coal.

MESSRS. C. H. BALL, J. H. MEED and others have incorporated the Cedarton (Ga.) Empire Water, Light and Manufacturing Company. They propose to erect a water and gas works at this point; also to engage in the manufacture of ice. The water works will be established first. The capital stock is $100,000.

Asphalt Pavements.

During the past 12 years upward of 3½ million square yards of genuine asphalt pavements have been laid in this country, and the tendency is to further progress in this direction. Captain Greene, who is an expert in such work, in a paper read before the American Institute of Mining Engineers, gives the following formulas for the construction of pavements of this class:

The form of construction which has usually been followed is a rigid foundation of ordinary concrete, 6 inches thick, on which the asphalt wearing-surface is placed. In some instances the foundation is of bituminous concrete. Each form of foundation has its advantages and disadvantages.

The ordinary concrete has an excess of strength for the purpose, and bituminous concrete is doubtless strong enough. With ordinary concrete the bond between the foundation and the wearing surface is not very great; hence it is very easy to strip off the surface in case repairs are necessary. But, on the other hand, the surface sometimes slips on the foundation, and, under traffic, rolls into waves and irregular surfaces, and sometimes cracks with sudden and great changes of temperature. With bituminous concrete, the foundation and wearing surface are united into one mass, and cannot easily be separated. Repairs are more difficult, but waving and cracking are less frequent. The bituminous concrete is less expensive. As it is not exposed to the atmosphere, coal tar residuum can be used in place of asphalt as the cementing material, and a strong concrete can be easily made by simply spreading the stone, compacting it with a roller, and pouring hot tar over and into it.

Whatever the form of foundation, it is desirable that the surface should be cemented with asphalt without the use of any product of coal tar. The reason for this has already been given—viz., that the products of coal tar are subject to oxidation by the atmosphere, which in time renders them brittle and friable, and devoid of any cementing qualities. The asphalt of Trinidad is not subject to this defect, for the reason that it has been exposed for centuries to the burning sun of a tropical climate, and the sun can have no further effect upon it. It is a staple compound, and its cementing qualities are proof against any atmospheric influences.

I am aware that one of the pavements in Washington, in which the cementing material was a mixture of tar and asphalt, has proved successful after 15 years' use; but, on the other hand, of other pavements laid by the same parties, at the same time and under the same specifications, some had to be resurfaced with asphalt after a few years' use, and others are now in a deplorable condition.

With the asphalt as a cement is combined the proper proportion (about 7 to 1 by weight, or 4 to 1 by volume) of fine sharp sand ranging from $\frac{1}{20}$ to $\frac{1}{100}$ of an inch in size. The two materials are thoroughly incorporated by suitable machinery at a temperature of about 300° F., and the plastic composition is taken to the street while still hot, spread on the foundation by means of hot iron rakes, and compacted by tamping and rolling. The result is a compact, durable sandstone of fine, uniform grain, with a slightly granular surface, the advantage of which will be manifest.

The bituminous nature of the cement makes the stone somewhat elastic, or, more properly speaking, ductile, and enables it to resist the heavy blows of horses and wheels without breaking. A rigid pavement of Portland cement-concrete, recently tried in New York, lasted just five months before it was renewed. The first holes appeared in three weeks.

Insurance and Oil Fuel.

The Hartford (Conn.) Insurance Company's experts have been investigating the risks attendant on the storage and use of oil fuel, the outcome of their deliberations being the enactment of the following rules:

I.—No storage of crude petroleum for fuel shall be allowed in any position where, in case of accident, it can flow towards the insured premises, or within less than 50 feet, if wholly under ground, or 100 feet if wholly or in part above ground. This excludes all storage in boiler rooms, or adjacent to premises, or feeding from oil cars.

II.—Delivery of oil to furnaces must be by suction or other process, whether by pump, vacuum or any other appliance that will accomplish the end sought, the supply to be lower than the furnace, so that, when not being used, the flow shall be away from, and not toward, the premises. This prohibits the feeding of oil by gravity pressure or by other means from a storage supply higher than the premises.

Where the foregoing conditions are fully complied with, and storage tank, if wholly under ground, is 100 feet or more from risk, or if wholly or in part above ground is 200 feet and upward distant, permission to use oil for fuel will be granted without extra charge. If storage tanks are located less than 100 feet and not less than 50 feet of risk, wholly under ground, or from 100 feet to 200 feet, if wholly or in part above ground, the extra charge will not be less than 25 cents.

French Opposition to Saccharine.

The French Chamber of Deputies has before it a measure which aims to prevent the importation of saccharine into that country. The substance of the measure is appended:

"The attention of the administration has been directed to a new coal tar product known as saccharine. This substance, which differs essentially in its elementary composition from vegetable sugars, possesses much greater sweetening power, a quality that was sure to lead to its being used as a substitute for sugar in many cases. We learned from our consular agencies abroad that factories were being established in certain countries for the purpose of bringing saccharine into competition with beet and cane sugar, not only in France, but also in other neighboring markets. The high cost of that substance seemed to constitute an insuperable obstacle to its general adoption, but lately the situation has changed. It can now be more cheaply produced, and already it is extensively used, mixed with glucose, in the preparation of jams, syrups and liqueurs. It has, therefore, become an urgent necessity to provide a remedy for the evil, in the interests of the customs receipts and that of the health of the consumer; for it has been shown by the report of Drs. Brouardel, Pouchet, and Ogier, in the name of the consulting committee of hygiene, that saccharine, and the various preparations derived from it, are noxious to health, and ought to be prohibited. Wherefore the government has deemed it expedient to prohibit the importation of saccharine and saccharined substances."

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Mr. Rew's Criticism of Mr. Egner's Comments on the Rew Apparatus.

2619 PRAIRIE AVE., CHICAGO, ILL., Feb. 1, 1889.

To the Editor AMERICAN GAS LIGHT JOURNAL:

Mr. Frederic Egner's Fourth Article, published in issue of the JOURNAL dated Jan. 28, 1889, gives erroneous information to and misleads the readers of the JOURNAL. He intimates, in reference to the first illustration, that "the apparatus is brought to a working heat in very much the same way ordinarily employed in water gas apparatus." This is not the case. Whereas every other water gas apparatus is heated up by applying a powerful blast to the fuel and burning the products by an intermediate air blast, then *forcing* the products through the generators by the pressure of the air blasts, in this apparatus a gentle blast (sufficient to overcome the friction of the gases passing through the coal) is admitted to the fuel chamber, another gentle blast (sufficient to overcome the friction of the gases passing through the brickwork) is admitted to the regenerator, and then the final burned products of combustion are *exhausted* from the base of the regenerator by the aid of a steam jet exhauster, a chimney, a mechenical exhauster, or any other equivalent device. By the former method of *forcing* the products through the apparatus, a large amount of unburned carbonic oxide is forced through the apparatus and burned in the open air, causing a serious waste of fuel. By this new method of exhausting the products the combustion of the carbonic oxide is completed in the regenerator, and that serious waste of fuel is avoided.

Now here is a very valuable improvement, the importance of which Mr. Egner utterly fails to recognize, although it is most clearly defined in the specification and drawings, and allowed in the claims accompanying the patent. Then, too, Mr. Egner fails to notice that the claims allowed by the Patent Office are very "broad" and cover the operation of exhausting the final burned products of combustion from a water gas apparatus, whether the air blast passes through the fuel upwards or downwards, and whether the final burned products are passed through the regenerator upwards, downwards or sideways.

Furthermore, Mr. Egner misleads the public by saying, "An apparatus of this description has been erected for a trial at one of the stations of the Consolidated Gas Company, of New York city;" for "nothing of the sort" has been or is being done. To be sure, an apparatus will be tried which combines the features of exhausting the final burned products of combustion. Those who are curious to know the other features of such apparatus can get correct information rather by applying to the writer, than by looking to the St. Louis oracle. Mr. Egner's article illustrates how many blunders a man can make who "rushes into print" in attempting to describe what he does not endeavor to thoroughly comprehend and inform himself about beforehand. It is a pity Mr. Egner should injure his reputation in this way, for he could so easily gather correct information if he were only so disposed and would take the necessary pains.

Yours truly. HENRY C. REW.

MR. LYMAN P. GEROULD, recently in charge at Monmouth, Ills., has been appointed Superintendent of the works at Mendota, same State.

THE rooms of the Business Men's Association, Pittsfield, Mass., will be lighted with gas, the electric system having been found too expensive.

The Market for Gas Securities.

The market for city gas shares was fairly active during the week, with rates a shade better on all classes. Consolidated sold up to 83, but towards the close of the week declined ¾. Equitable trading on the Exchange was confined to small lots, but all the dealings were made at a better price than that recorded in our last auction sale report (112), the last transfer of which we have cognizance being returned (33 shares) at 113½. Standard shares are decidedly dull and weak. Brooklyn stocks show no change. In connection with that city we may note the appearance of Edison's branch Company for that district on the share market. "Full paid" stock is offered at 75. From the point chosen for the location of the generating station, we imagine the lighting of the public buildings—the City Hall, Hall of Records, Municipal Building, County Court House, etc.—will be given over to these parties; for evidently the "Ring" has much to do with Mr. Chinnock's enterprise. Cincinnati shares are up to 200, and last week in that city stock in the U. S. Steam Stoking Company was bid for at 30. We are at last enabled to state something positively about the Boston situation. In a nutshell this is that the trustees are perfectly willing to sell the stock that is pooled at the upset figure of $1200; and as the Bay State Company people *must* purchase the old Company in order to save their "other investments," it is likely only a question of time when the deal will be made—unless, on the other hand, the Bay State "investments" are saved through the purchase of the same by the old Boston Company. San Francisco gas is at 61. In fact all descriptions of California gas shares are strong to the point of buoyancy.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,

16 Wall St., New York City.

February 11.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	82⅛	82⅜
Central	466,000	50	—	—
" Scrip	220,000	—	47	57
Equitable	2,000,000	100	112	115
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	115	118
Mutual	3,500,000	100	98	100
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern	125,000	50	30	—
" Scrip	108,000			
Yonkers		50	90	100
Richmond Co., S. I.	300,000	50	55	60
" Bonds	12,000	—	—	—

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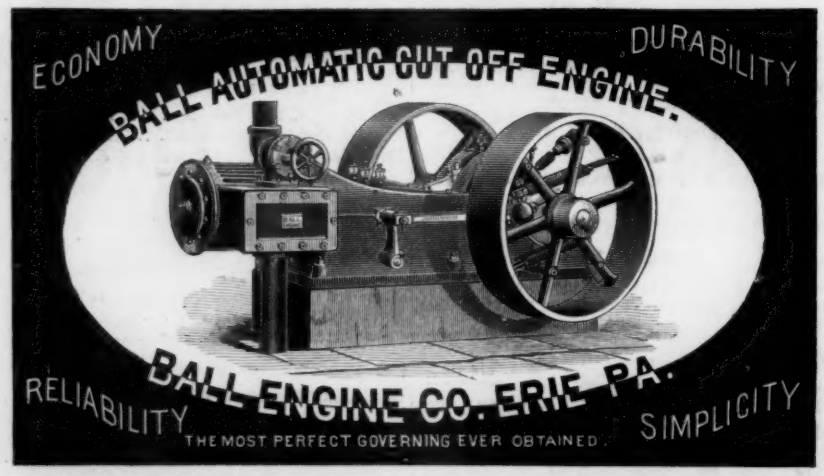

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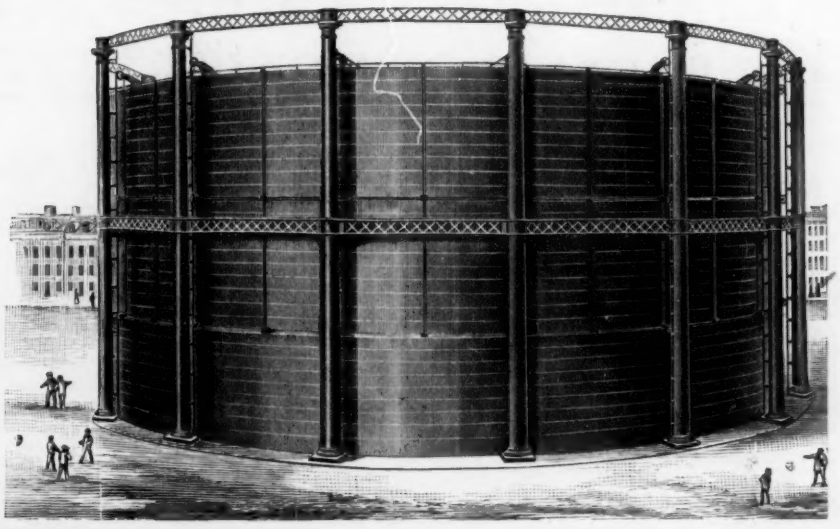

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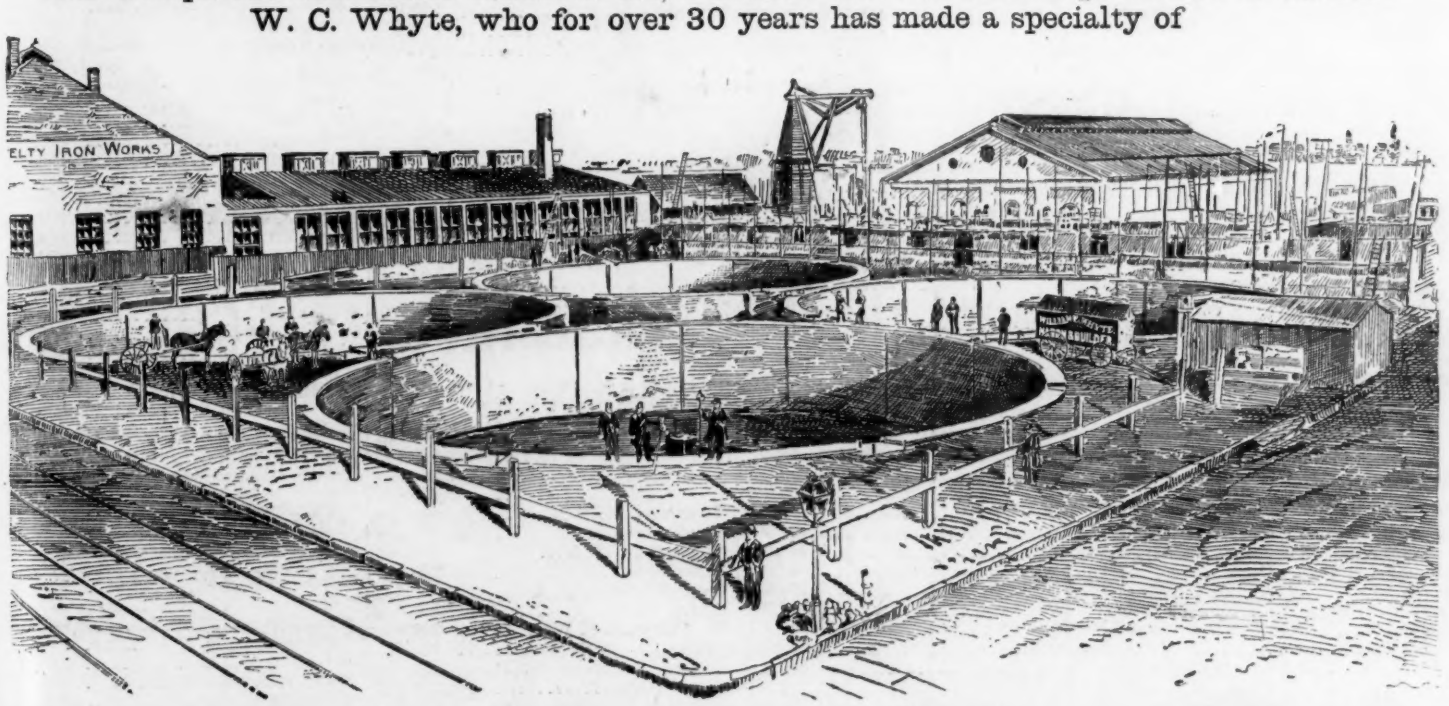

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"	1,500,000
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Arcachon	100,000
Animal Charcoal Co	200,000
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"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
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"	1,000,000
"	1,000,000
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Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
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"	300,000
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"	1,000,000
" **Nassau**	1,000,000
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Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
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Cincinnati, "	1,500,000
" "	1,500,000
Chicago "	3,000,000
" "	1,000,000
" "	1,000,000
Chemnitz	1,000,000
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Colonial Gas Works Co	100,000
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Charlottenburg	600,000
Dudley	750,000
Driffield	100,000
Dukenfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000

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Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A	350,000
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" "	1,000,000
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"	2,000,000
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Fenton	400,000
Friedenshutte	500,000
Furth	400,000
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Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
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"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000

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Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms	3,000,000
"	3,000,000
South Metropolitan Co:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U. S. A	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lilie	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U. S. A	250,000
Lawrence "	500,000
Lynn "	300,000
Lyons	1,500,000
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"	1,500,000
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"	1,500,000
"	1,500,000
"	1,500,000
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"	2,500,000
"	2,500,000
"	2,000,000
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"	1,750,000
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"	1,000,000
"	2,500,000
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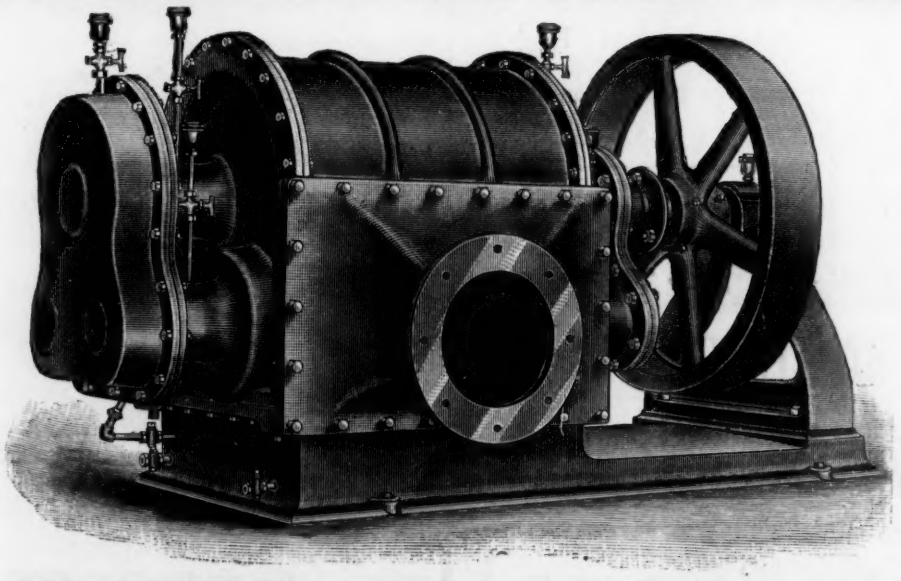

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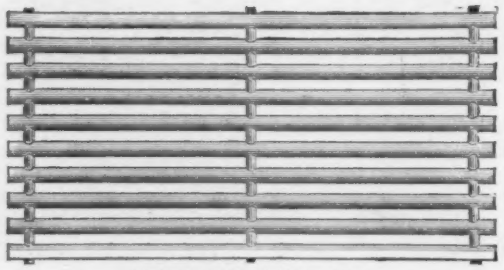

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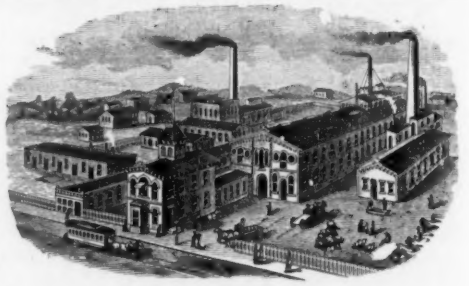

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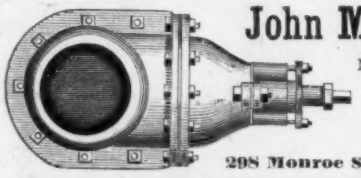

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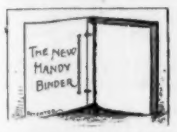

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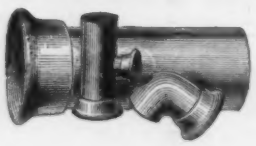

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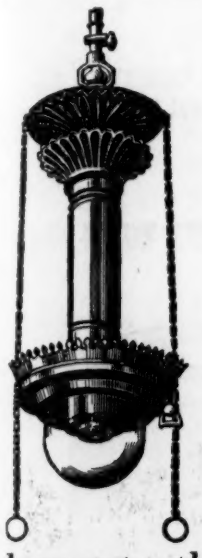

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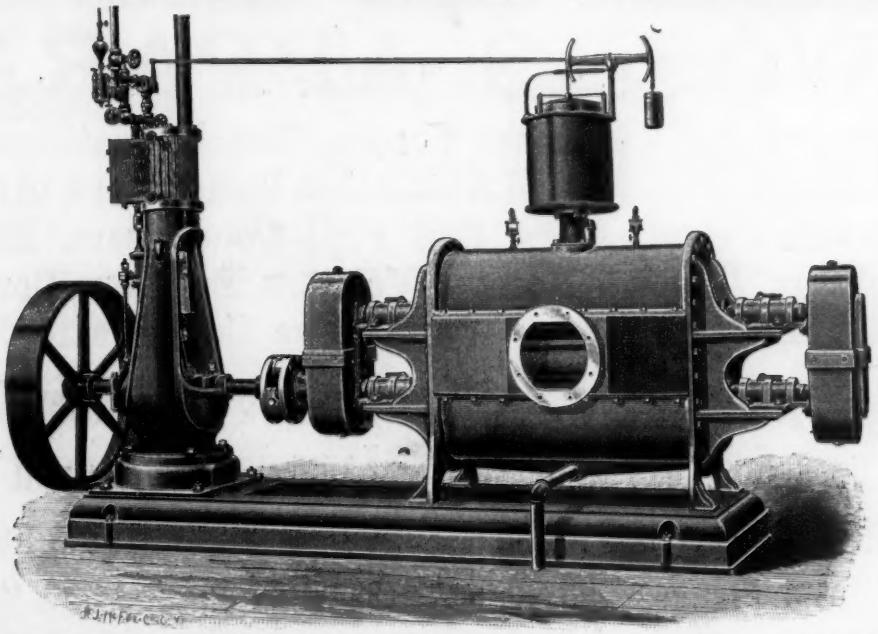

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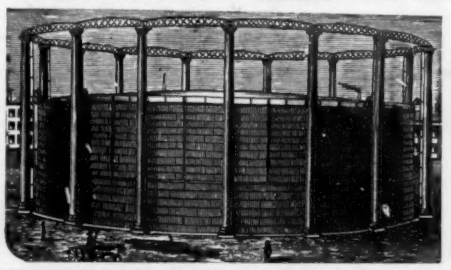

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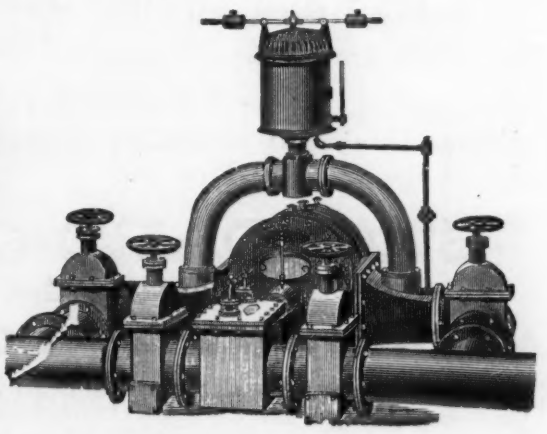

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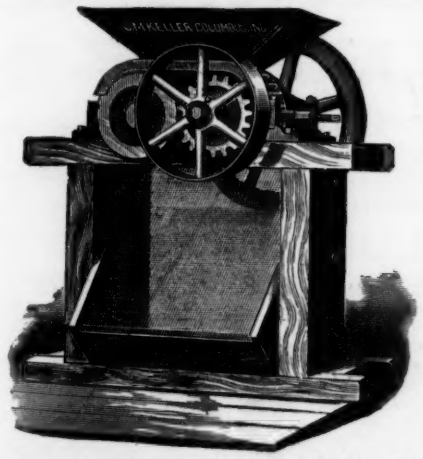

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Gas into Electricity

BY THE

OTTO GAS ENGINES.

Gas Companies are given by the Otto Gas Engine superior means for Production of Power and Electric Light.

In Theory the Otto Gas Engine realizes 18 per cent. actual work out of number of heat units in fuel consumed, while the ordinary steam plants reach but 12 per cent. **In Practice** a comparison of cost in dollars and cents between gas and steam power stands as follows (the figures below being taken from actual experience):

50-H.P. STEAM ENGINE AND BOILER, Running a Plant of Fifty 2000-C.P. Arc Lamps 12 Hours.	
4,500 lbs. Indiana nut and slack, at $1.30 per ton	$2 93
Engineer, one night, at $50 per month	1 67
Trimmer, one day, at $40 per month	1 33
Superintendent or Electrician, one day, at $50 per month	1 66
Waste, etc., one day, at $20 per year	05
Water rent, one day, at $40 per year	11
Wheeling coal and removing ashes, at $4 per week	58
100 pairs carbons, at $18.50 per 1000	1 85
One pint cylinder oil, at 60 cents per gallon	07
One quart engine and dynamo oil, at 50 cents per gallon	13
Total	$10 38

50-H.P. OTTO GAS ENGINE, Running a Plant of Fifty 2000 C.P. Arc Lamps 12 Hours.	
9,200 cu. ft. gas, at 42 cts. per M. (for cost of gas see items below)	$3 86
Engineer not needed; engine is in care of Electrician or Supt.	....
Trimmer, one day, at $40 per month	1 33
Superintendent or electrician, one day, at $50 per month	1 66
Waste, etc., one day, at $20 per year	05
Water rent dispensed with (cooling water used over and over)	....
Handling of coal included in cost of gas	....
100 pairs carbons, at $18.50 per 1,000	1 85
One pint cylinder oil, at 60 cents per gallon	07
One quart engine and dynamo oil, at 50 cents per gallon	13
Total	$8 95

Expenses of depreciation, repairs, and interest omitted, being considered the same in both cases—though depreciation and repairs are much higher with steam on account of boiler and its appurtenances. Cost of gas in the holder we estimate for most of the Middle and Western States as follows: Coal, 30 cts.; labor, 20 cts.; purification, 2 cts.; total, 52 cts. Less coke, 7 cts., and tar, 3 cts.; leaving net cost of gas 42 cts. The items of Superintendence and repairs, being paid for by the gas sold to consumers, need not be charged on extra output for gas engine consumption. Where the cost of gas is higher than here figured, coal for steam use will be found proportionally higher, and final figures of comparison show same amount of saving.

Excess in Cost of Steam over Gas Power is thus $1.43, or nearly 16 per cent.

Coal for getting up steam and banking fires is not included in above figures, and should be added, thus increasing rate of economy of gas power beyond that shown by our figures.

Where Gas Companies adopt Gas Power for Electric Plants, Water Works, Sewerage, etc., they not only choose **the most economical power for their use,** but secure to themselves the **numerous advantages of increased production,** without increase of expense, and benefit thereby their entire manufacture. They induce consumers, by their example, to abandon Steam for Gas Power, and, by establishing special rates, make

Gas Power the Leading Power of To-Day,

AND SOLVE AT ONCE THE QUESTION OF FUEL GAS.

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